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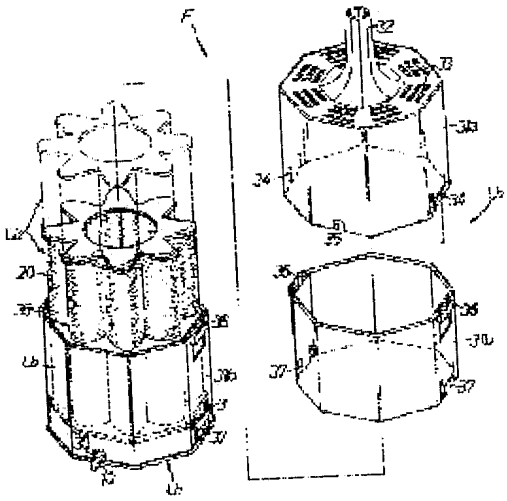
(54) FILTER

(57)Abstract:
PURPOSE: To provide a filter designed to easily and variably regulate its ability at any desired time according to the volume of the water to be purified.
CONSTITUTION: A filtering case is made up of (A) a basal case 31a, (B) at least one auxiliary case 31b connected detachably to the open lower end of the basal case and (C) a cover body U1 fitted detachably at the open lower end of the auxiliary case. This filtering case is housed with plural filtering units U2 mutually laminated corresponding to the basal case 31a and auxiliary case 31b, respectively.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] It is the filter which is installed in a cistern (1) and was made to carry out suction filtration of the water in this cistern (1) in response to the pressure air from an air pump (P). The 1st filtration unit (U1, U1 '), At least one 2nd filtration unit by which a laminating is carried out on this 1st filtration unit (U1, U1 ') (U2, U2 '), It consists of a covering unit (U3, U3 ') which covers this 2nd filtration unit (U2, U2 '), and is attached in said 1st filtration unit (U1, U1 ') free [attachment and detachment]. Said 1st filtration unit (U1, U1 ') The granular filter media (18 18') which serve as a weight are enclosed in the letter case of closeout (17). It comes to carry out opening of the air injection tip (7a) which stands in a row in said air pump (P) while carrying out opening of the water absorption hole (6) to the base of said letter case of closeout (17) and carrying out opening of the negotiation hole (16) to the top face. Said 2nd filtration unit (U2, U2 ') Loop a maintenance frame (19) around tabular filter media (20 20') to tubed, and it is constituted. The clarification room (29) which is open for free passage to said air injection tip (7a) while it is open for free passage in said 1st filtration unit (U1, U1 ') through said negotiation hole (16) to the interior is formed. Moreover, collaborate with said covering unit (U3, U3 ') in the exterior, and it comes to form a non-purified room (30). The filter which comes to carry out opening of the water absorption hole (33) which is open for free passage in said non-purified room (30) while really forming the drain pipe (32) which is open for free passage to said covering unit (U3, U3') at said clarification room (29).

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] breeding of appreciation fish, such as a goldfish, tropical fish, etc. which this invention is installed in a cistern and were made to carry out suction filtration of the water in a cistern in response to the pressure air from an air pump, -- it is the filter of service water and especially clarification of filter media and exchange are related with an easy filter.
[0002]
[Description of the Prior Art] While dividing the inside of the filtration case installed in a cistern up and down, forming a vertical section filtration room and preparing comparatively dense filter media in an up filtration room conventionally, the filter with which prepare **** filter media in a lower filtration room, those filter media are made to carry out the diversion-of-river transparency of the non-purified water, and high filtration capacity was acquired is already well-known (refer to JP,60-7932,B).
[0003]
[Problem(s) to be Solved by the Invention] By the way, in this filter, since muck, such as a feed residue and stools, adhered to two filter media and it deposited while using it, those filter media needed to be washed or exchanged periodically, and there was a problem of granular filter media, such as a pebble as **** filter media and ballast, having fallen from a filtration container, or having scattered, and being hard to do said activity, at that time.
[0004] This invention was made in view of the above-mentioned situation, and aims at offering said filter which can do washing and exchange of filter media easily.
[0005]
[Means for Solving the Problem] This invention is the filter which is installed in a cistern and was made to carry out suction filtration of the water in this cistern in response to the pressure air from an air pump in order to attain the above-mentioned object. The 1st filtration unit, At least one 2nd filtration unit by which a laminating is carried out on this 1st filtration unit, It consists of a covering unit which covers this 2nd filtration unit and is attached in said 1st filtration unit free [attachment and detachment]. Said 1st filtration unit Enclose the granular filter media which serve as a weight in the letter case of closeout, and opening of the water absorption hole is carried out to the base of said letter case of closeout. It comes to carry out opening of the air injection tip which stands in a row in said air pump while carrying out opening of the negotiation hole to the top face. Moreover, said 2nd filtration unit The clarification room which is open for free passage to said air injection tip while looping a maintenance frame around tabular filter media to tubed, being constituted and being open for free passage in said 1st filtration unit through said negotiation hole to the interior is formed. Moreover, while really forming the drain pipe which collaborate with said covering unit in the exterior, and it comes to form a non-purified room, and is open for free passage to said covering unit at said clarification room, it is characterized by coming to carry out opening of the water absorption hole which is open for free passage in said non-purified room.
[0006]
[Example] Hereafter, if a drawing explains the 1st example of the filter of this invention the condition of

having installed the filter F of this example in the cistern 1 shows drawing 1 -- having -- **** -- this filter F -- the 1st filtration unit U1 this 1st filtration unit U1 The 2nd filtration unit U2 laid upwards This 2nd filtration unit U2 covering -- said 1st filtration unit U1 Covering unit U3 attached free [attachment and detachment] from -- it is constituted.

[0007] The 1st filtration unit U1 As shown in drawing 3 , it saw from the flat surface which the top face opened, and has the polygonal carrier dished filter-media hold object 2. The engagement piece 3 of a couple is formed in the both sides of the lateral surface of this filter-media hold object 2 at one, and many support ribs 4 and four stop heights 5 are formed in a medial surface at one. While many water absorption holes 6 are drilled in the base of the filter-media hold object 2 by the radial, the short cylindrical shape feed pipe 7 which has air injection-tip 7a in the center section protrudes on one. As shown in drawing 1 , the air injection cylinder 8 of the hollow which blockaded the upper bed which consists of permeability raw materials, such as fizz synthetic resin, makes that soffit contact said step 7b, and fitting is carried out to the interior of the hollow which has step 7b of this feed pipe 7. The interior of hollow of a feed pipe 7 is connected to the inner edge of the charging path 9 formed in the base of the filter-media hold object 2 at one, and opening of the outer edge of the charging path 9 is carried out to the side face of the filter-media hold object 2. And fitting of the extraction and insertion of a connector 10 is made possible to the outer edge which carries out opening to filter-media hold object 2 side face of this charging path 9, and this connector 10 is connected to an air pump P through an airpipe 11. Moreover, regular intervals are consisted in the peripheral face of said feed pipe 7 at a circumferencial direction, and two or more support ribs 12 are formed in one (refer to drawing 3).

[0008] The lid 14 of this hold object 2 is put on top-face opening of the filter-media hold object 2 removable. That is, crevice 14a which may engage with the stop heights 5 of said filter-media hold object 2 is formed in the perimeter of a lid 14, and opening of the filter-media hold object 2 is covered with a lid 14 by making these engaged mutually. In this case, the rear face of a lid 14 is supported with the support ribs 4 and 12 of said large number. The air through-hole 15 which said air injection-tip 7a faces is formed in the center section of the lid 14, and many negotiation holes 16 are drilled in the perimeter of the air through-hole 15 by the radial. And the letter case 17 of closeout is constituted by said filter-media hold object 2 and lid 14, and the **** granular filter media 18 which consist of a pebble which acts as a weight for preventing the relief of Filter F are enclosed with the interior of this letter case 17 of closeout.

[0009] The 2nd filtration unit U2 laid on the letter case 17 of closeout It consists of the dense tabular filter media 20 which consist of synthetic-resin material of the porosity around which the maintenance frame 19 and this maintenance frame 19 are looped to tubed etc. As the maintenance frame 19 is shown in drawing 1 and drawing 3 , it regards as the stellate crown plate 22 from a flat surface, an exhaust port 21 is drilled in a center section, and it sees from a flat surface, the polygonal bottom plate 23 is connected with two or more connection levers 24 at one, and it is constituted, and while a bottom plate 23 has the air through-hole 15 of a lid 14, and the opening 25 open for free passage in the center section, many through-holes 26 are drilled in the perimeter of the opening 25 by the radial. While two or more stop projections 27 caudad prolonged at equal intervals around an exhaust port 21 in the underside of a crown plate 22 protrude on one, said stop projection 27 is countered also on the top face of a bottom plate 23, and the stop projection 28 protrudes on one.

[0010] After the tabular filter media 20 stop by turns to said stop projections 27 and 28 to which the inner skin was **(ed) for said connection lever 24, and they opposite-**(ed) the peripheral face to the crown plate 22 and the bottom plate 23, and fixed maintenance is carried out at the maintenance frame 19, namely, the tabular filter media 20 were crooked in the shape of a wave, as shown in drawing 2 , and tubed has ****(ed), it is said 1st filtration unit U1. It is arranged upwards. And the clarification room 29 with the comparatively big volume which is open for free passage to said air injection-tip 7a while it is open for free passage in the letter case 17 of closeout through said negotiation hole 16 and through-hole 26 to the inside is formed, and it is the covering unit U3 to the outside. It collaborates with covering 31 medial surface for wastewater mentioned later, and the non-purified room 30 is formed.

[0011] Covering unit U3 The water absorption hole 33 of a large number which it consists of rectangular

pipe-like covering 31a for wastewater, and the drain pipe 32 connected with said clarification room 29 in the top-face center section of this covering 31a protrudes on one, and are open for free passage around a drain pipe 32 at said non-purified room 30 is drilled in a radial. The engagement pawls 34 and 34 of the couple which may engage with the both sides of the side-face soffit of covering 31a for wastewater with the engagement pieces 3 and 3 of said filter-media hold object 2 are formed in one, and the notching 35 which inserts in the connector 10 connected to said charging path 9 is formed between both the engagement pawl 34 of a side-face soffit, and 34.

[0012] Next, an operation of this example is explained.

[0013] If the filter F constituted as mentioned above is installed in cistern 1 base which laid the pebble etc. and an air pump P is now operated as shown in drawing 1 , air will be supplied to air injection-tip 7a through an airpipe 11, a connector 10, and the charging path 9 from an air pump P, and this air will be spouted by the clarification room 29 of the tabular filter-media 20 interior in the shape of air bubbles through the air injection cylinder 8 from there. It becomes an air current, the inside of this clarification room 29 is gone up, the water in the clarification room 29 also goes up in connection with it, and that blowout air is breathed out in a cistern 1 through an exhaust port 21 and a drain pipe 32. Water absorbing power acts on the clarification room 29. Consequently, the corruption water in a cistern 1 As an arrow head shows to drawing 1 , after the part is inhaled at the non-purified room 30 from the water absorption hole 33 on the top face for wastewater of covering 31a, penetrates the tabular filter media 20 from there and is made into clarification, it flows into the clarification room 29. Moreover, it is inhaled in the letter case 17 of closeout from the water absorption hole 6 which other parts drilled in the filter-media hold object 2 of the letter case 17 of closeout through clearances, such as a pebble with which cistern 1 base was covered. After penetrating the granular filter media 18 held there and being made clarification, it flows into the clarification room 29 through the negotiation hole 16 of a lid 14, and the through-hole 26 of a bottom plate 23. And the water in the clarification room 29 defecated by passing both the filter media 18 and 20 flows into a drain pipe 32 through the exhaust port 21 by which opening was carried out to the crown plate 22 with the air injected by this clarification room 29 from the air injection cylinder 8, and is returned in a cistern 1 as clean water from there.

[0014] According to the 1st example equipped with the above-mentioned configuration, the tabular filter media 20 are compared with the granular filter media 18. Since water flow resistance is strong, The rate of flow of the corruption water which penetrates it becomes comparatively small, and propagation of the aerobic bacteria containing useful bacteria, such as chlorella which will be hard to generate if the rate of flow is large, is urged in the tabular filter media 20. While being able to disassemble the organic substance which adheres to the tabular filter media 20 by these aerobic bacteria, such as a feed residue and stools, and being able to prevent that blinding, bacteria, such as chlorella, can be offered as a live bait of the appreciation fish in a cistern 1.

[0015] Moreover, although the tabular filter media 20 tend to start blinding compared with the granular filter media 18, since the water in a cistern 1 is always flowing into the clarification room 29 through the granular filter media 18 with comparatively small water flow resistance within the letter case 17 of closeout from the water absorption hole 6 In the clarification room 29, water absorbing power has always occurred, therefore the water in the non-purified room 30 is inhaled through the tabular filter media 20 at the clarification room 29, the stream from the non-purified room 30 to the clarification room 29 cannot stop, it can continue at a long period of time, and the good filtration by the tabular filter media 20 can be maintained.

[0016] By the way, according to the activity of said filter F, it is the 1st filtration unit U1. The inner granular filter media 18 and the inner 2nd filtration unit U2 Although cleaning or exchange **** is periodically required for these filter media 18 and 20 since muck, such as a feed residue and stools, adheres and accumulates on the tabular filter media 20 gradually, in such a case, it is said each unit U1 and U2. And U3 It can decompose. That is, as shown in drawing 3 only by grasping Filter F and removing engagement on the engagement piece 3 of the letter case 17 of closeout, and the stop pawl 34 of covering 31a for wastewater, they are the 1st filtration unit U1 and the 2nd filtration unit U2. And covering unit U3 It can decompose easily. it seems that in this case, the granular filter media 18 do not

have a thing which is enclosed in the letter case 17 of closeout and which comes out, fall from this case 17 or scatters during decomposition, and the tabular filter media 20 move at ****, or they do not transform them during decomposition since maintenance immobilization is carried out at the maintenance frame 19 Therefore, disassembly of Filter F and an assembly can be performed easily.
[0017] And the 1st filtration unit U1 If it shakes and moves, pouring water for grasping, the muck which carried out adhesion deposition will be easily removed by the granular filter media 18, and if the tabular filter media 20 are removed from the maintenance frame 19 and this is washed, the muck which carried out adhesion deposition will be removed by the tabular filter media 20.
[0018] Moreover, in exchanging the granular filter media 18 and the tabular filter media 20 for filter-media 18' from which other filtration capacity differs, and 20', as it shows in drawing 3 , it is the 1st filtration unit U1 beforehand about those filter media 18 and 20. And the 2nd filtration unit U2 Exchange of filter media 18, 20;18', and 20' can be easily performed by what is necessary's being just to incorporate, respectively, and doing so.
[0019] In addition, since the letter case 17 of closeout can be opened and closed with a lid 14, it can pick out the granular filter media 18 from a case 17 if needed.
[0020] Next, drawing 4 explains the 2nd example of this invention.
[0021] Filter F' of this 2nd example is the 2nd filtration unit U2. The points which carry out a laminating to two or more steps, and these 2nd filtration units U2 In order to cover, the point which constituted covering unit U3' in the shape of multistage differs from the 1st above-mentioned example. That is, covering unit U3 ' of this example consists of the 1st above-mentioned example and one covering 31for wastewater a of this structure which can be freely detached and attached to two or more tubed covering 31b which can be detached and attached freely, and this tubed covering 31b mutually. Tubed covering 31b is the 2nd filtration unit U2. It has the height which can be held and the engagement pawls 37 and 37 of a couple are formed in soffit both sides for the engagement pieces 36 and 36 of a couple at one again at the upper bed both sides of the lateral surface. Similarly these engagement pieces 36 and the engagement pawl 37 are formed, respectively with the engagement piece 3 of said filter-media hold object 2, and the engagement pawl 34 of covering 31a for wastewater. In addition, the notching 38 for connector 10 insertion is formed in covering 31b connected with the letter case 17 of closeout at least among said two or more tubed covering 31b. and in assembling filter F' of this example The 1st filtration unit U1 It is the 2nd filtration unit U2 upwards. After laying, it is the 1st filtration unit U1 about tubed covering 31b. It connects. Then, it is the following 2nd filtration unit U2 on said 2nd filtration unit U2. After laying, the following tubed covering 31b is connected with said tubed covering 31b, this activity is repeated successively and, finally covering 31a for wastewater is connected with tubed covering 31b of the maximum upper case. Or the 1st filtration unit U1 The 2nd filtration unit U2 of plurality [top] It is the 2nd filtration unit U2 about covering 31for wastewater a and two or more tubed covering 31b which were beforehand connected after carrying out the laminating. While covering a group, tubed covering 31b of the bottom is connected with the letter case 17 of closeout.
[0022] according to the 2nd example of this invention equipped with the above-mentioned configuration -- the 2nd filtration unit U2 suitably -- ******** -- since the area of the tabular filter media 20 can be suitably fluctuated by things, the clarification capacity of filter F' can be adjusted according to the capacity of the water which should be purified.
[0023] As mentioned above, although the example of the filter by this invention was explained in full detail, this invention can perform various small design changes, without deviating from this invention which is not limited to said example and indicated by the claim.
[0024] In each above-mentioned example, for example, **** of covering 31for wastewater a or tubed covering 31b, and the letter case 17 of closeout, To **** of covering 31a for wastewater, and tubed covering 31b, or **** of tubed covering 31b Without being limited to this, although the example using the engagement pieces 3 and 36 and the engagement pawls 34 and 37 was shown, the step which can fit in mutually may be formed in each part material, and, thereby, you may connect with it free [attachment and detachment], for example.
[0025]

[Effect of the Invention] According to this invention, it is the filter which is installed in a cistern and was made to carry out suction filtration of the water in this cistern in response to the pressure air from an air pump. As mentioned above, the 1st filtration unit, At least one 2nd filtration unit by which a laminating is carried out on this 1st filtration unit, It consists of a covering unit which covers this 2nd filtration unit and is attached in said 1st filtration unit free [attachment and detachment]. Said 1st filtration unit Enclose the granular filter media which serve as a weight in the letter case of closeout, and opening of the water absorption hole is carried out to the base of said letter case of closeout. It comes to carry out opening of the air injection tip which stands in a row in said air pump while carrying out opening of the negotiation hole to the top face. Moreover, said 2nd filtration unit The clarification room which is open for free passage to said air injection tip while looping a maintenance frame around tabular filter media to tubed, being constituted and being open for free passage in said 1st filtration unit through said negotiation hole to the interior is formed. Moreover, since it comes to carry out opening of the water absorption hole which is open for free passage in said non-purified room while really forming the drain pipe which collaborate with said covering unit in the exterior, and it comes to form a non-purified room, and is open for free passage to said covering unit at said clarification room It is possible to disassemble each unit, cleaning in the 1st and 2nd filtration unit and exchange can be performed easily, and it can clean easily, without scattering the granular filter media in the 2nd filtration unit outside especially. Moreover, exchange with the 1st and 2nd filtration unit which held filter media of a different kind can be performed easily.

[Translation done.]

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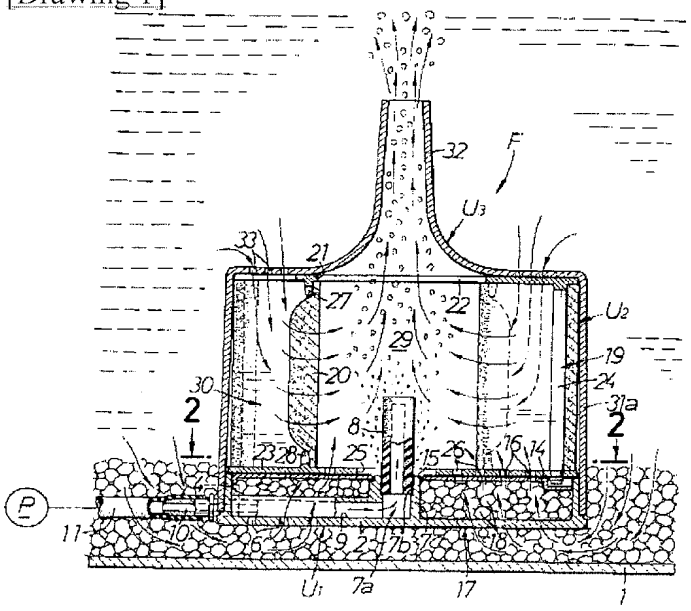
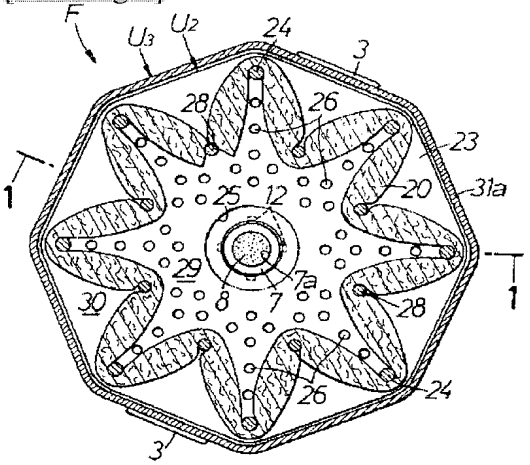
DRAWINGS

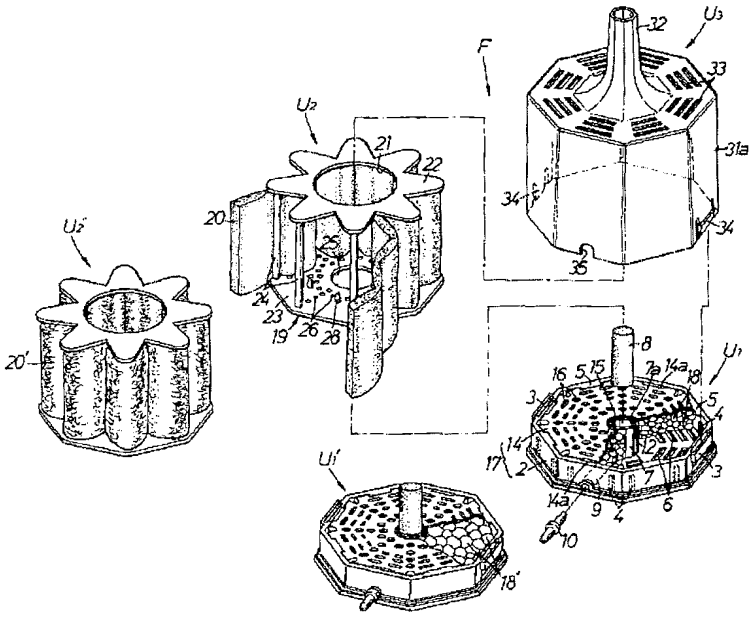
[Drawing 1]



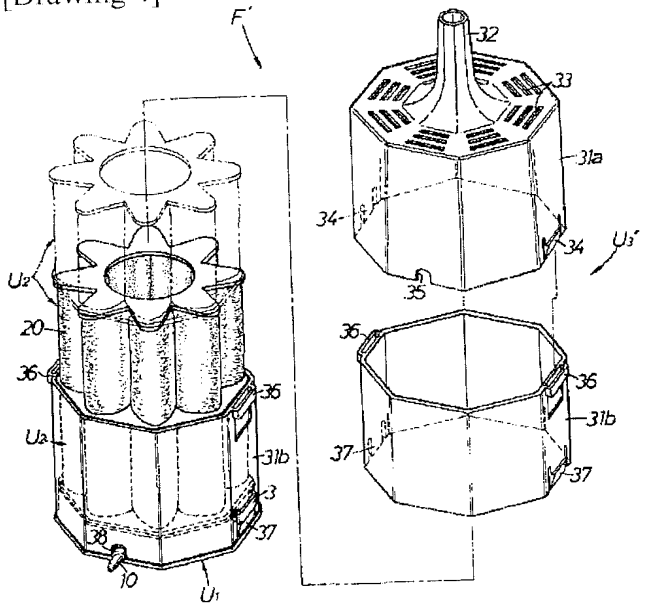
[Drawing 2]



[Drawing 3]



[Drawing 4]



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WRITTEN AMENDMENT

---------- [procedure amendment]
[Filing Date] October 9, Heisei 4
[Procedure amendment 1]
[Document to be Amended] Description
[Item(s) to be Amended] Whole sentence
[Method of Amendment] Modification
[Proposed Amendment]
[Document Name] Description
[Title of the Invention] Filter
[Claim(s)]
[Claim 1] In the filter which is installed in a cistern (1) and was made to carry out suction filtration of the water in a cistern (1) in response to the pressure air from an air pump (P) The bottom wall unit which carried out opening of the air injection tip (7a) which stands in a row in an air pump (P) to the upper part (U1), At least two filtration units (U2 and U2) by which a laminating is carried out on this bottom wall unit (U1), While covering this filtration unit (U2 and U2), an open soffit consists of a covering unit (U3) closed with said bottom wall unit (U1). Said each filtration unit (U2) so that the clarification room (29) which is [the interior] open for free passage to said air injection tip (7a) may collaborate with said covering unit (U3) in the exterior again and a non-purified room (30) may be formed, respectively A maintenance frame (19) is looped around tabular filter media (20) to tubed, and it is constituted. Said covering unit (U3) One covering for wastewater which has at one the drain pipe (32) which is open for free passage in said clarification room (29) in the upper part (31a), At least one tubed covering for connection (31b) connectable with the open soffit of this covering for wastewater (31a) is arranged up and down, and it is constituted. In the soffit of said covering for wastewater (31a) The 1st stop section (34) which can engage and release all of the 2nd engaged portion (36) prepared in the upper bed of the 1st engaged portion (3) prepared in said bottom wall unit (U1) and covering for connection (31b) Moreover, the 2nd stop section (37) which can engage and release both said 1st engaged portion (3) and said 2nd engaged portion (36) of other coverings for connection (31b) is prepared in the soffit of each covering for connection (31b), respectively. Furthermore, the filter characterized by carrying out opening of the water absorption hole (33) which is open for free passage in said non-purified room (30) to said covering for wastewater (31a).
[Detailed Description of the Invention]
[0001]
[Industrial Application] breeding of appreciation fish, such as a goldfish, tropical fish, etc. which this invention is installed in a cistern and were made to carry out suction filtration of the water in a cistern in response to the pressure air from an air pump, -- it is related with the filter of service water.
[0002]
[Description of the Prior Art] The bottom wall which carried out opening of the air injection tip which

stands in a row in an air pump conventionally to the upper part, and one filtration unit which loops a maintenance frame around tabular filter media to tubed, is constituted, and is laid on a bottom wall, While constituting a filter from covering on which an open soffit is put removable with said bottom wall unit while covering this filtration unit The clarification room which prepares a drain pipe and a water absorption hole in the upper part of a covering unit, and is open for free passage to an air injection tip and a water absorption hole inside a filtration unit Moreover, what collaborates with covering in the exterior and formed the non-purified room, respectively is conventionally well-known so that it may be indicated by JP,61-15724,B.

[0003]

[Problem(s) to be Solved by the Invention] By the way, since only one ** cannot build in a filtration unit in this well-known filter conventionally in the filtration case which consists of the above-mentioned covering and a bottom wall, When it is going to obtain two or more kinds of filters with which filtration capacity is different from each other The filtration unit with which two or more kinds corresponding to the filtration capacity of magnitude differs, It is necessary to prepare specially two or more kinds of exclusive filtration cases corresponding to these filtration unit. When there was a problem that cost increases so much and it was going to change the filtration capacity of a filter in use in the future, the new filter which has the filtration capacity which it is going to change needed to be prepared separately, and the not easy problem also had the modification.

[0004] This invention was made in view of the above-mentioned situation, and aims at offering said filter which enabled it to change suitably simply the ****** capacity which uses the filtration unit and filtration case of a single class.

[0005]

[Means for Solving the Problem] In the filter which according to this invention is installed in a cistern and was made to carry out suction filtration of the water in a cistern in response to the pressure air from an air pump in order to attain the above-mentioned object The bottom wall unit which carried out opening of the air injection tip which stands in a row in an air pump to the upper part, and at least two filtration units by which a laminating is carried out on this bottom wall unit, While covering this filtration unit, an open soffit consists of a covering unit closed with said bottom wall unit. Said each filtration unit So that the clarification room which is [the interior] open for free passage to said air injection tip may collaborate with said covering unit in the exterior again and a non-purified room may be formed, respectively A maintenance frame is looped around tabular filter media to tubed, and it is constituted. Said covering unit One covering for wastewater which has at one the drain pipe which is open for free passage in said clarification room in the upper part, At least one tubed covering for connection connectable with the open soffit of this covering for wastewater is arranged up and down, and it is constituted. In the soffit of said covering for wastewater The 1st stop section which can engage and release all of the 2nd engaged portion prepared in the upper bed of the 1st engaged portion prepared in said bottom wall unit and covering for connection again in the soffit of each covering for connection The 2nd stop section which can engage and release both said 1st engaged portion and said 2nd engaged portion of other coverings for connection is prepared, respectively, and opening of the water absorption hole which is open for free passage in said non-purified room is further carried out to said covering for wastewater.

[0006]

[Example] Hereafter, if a drawing explains one example of the filter of this invention, the condition of having installed the filter F of this example in the cistern 1 is shown in drawing 1 . This filter F the one 1st filtration unit U1 as a bottom wall unit This 1st filtration unit U1 At least one 2nd filtration unit (at what was shown in drawing 1 , they are two pieces) U2 laid upwards this 2nd filtration unit U2 while covering -- an open soffit -- the 1st filtration unit U1 Covering unit U3 with which it is closed from -- it is constituted.

[0007] The 1st filtration unit U1 As shown in drawing 3 , it saw from the flat surface which the top face opened, and has the polygonal carrier dished filter-media hold object 2. The engagement piece 3 of the couple as the 1st engaged portion is formed in the both sides of the lateral surface of this filter-media

hold object 2 at one, and many support ribs 4 and four stop heights 5 are formed in a medial surface at one. While many water absorption holes 6 are drilled in the base of the filter-media hold object 2 by the radial, the short cylindrical shape feed pipe 7 which has air injection-tip 7a in the center section protrudes on one. As shown in drawing 1 , the air injection cylinder 8 of the hollow which blockaded the upper bed which consists of permeability raw materials, such as fizz synthetic resin, makes that soffit contact said step 7b, and fitting is carried out to the interior of the hollow which has step 7b of this feed pipe 7. The interior of hollow of a feed pipe 7 is connected to the inner edge of the charging path 9 formed in the base of the filter-media hold object 2 at one, and opening of the outer edge of the charging path 9 is carried out to the side face of the filter-media hold object 2. And fitting of the extraction and insertion of a connector 10 is made possible to the outer edge which carries out opening to filter-media hold object 2 side face of this charging path 9, and this connector 10 is connected to an air pump P through an airpipe 11. Moreover, regular intervals are consisted in the peripheral face of said feed pipe 7 at a circumferencial direction, and two or more support ribs 12 are formed in one (refer to drawing 3).

[0008] The lid 14 of this hold object 2 is put on top-face opening of the filter-media hold object 2 removable. That is, crevice 14a which may engage with the stop heights 5 of said filter-media hold object 2 is formed in the perimeter of a lid 14, and opening of the filter-media hold object 2 is covered with a lid 14 by making these engaged mutually. In this case, the rear face of a lid 14 is supported with the support ribs 4 and 12 of said large number. The air through-hole 15 which said air injection-tip 7a faces is formed in the center section of the lid 14, and many negotiation holes 16 are drilled in the perimeter of the air through-hole 15 by the radial. And the letter case 17 of closeout is constituted by said filter-media hold object 2 and lid 14, and the **** granular filter media 18 which consist of a pebble which acts as a weight for preventing the relief of Filter F are enclosed with the interior of this letter case 17 of closeout.

[0009] The 2nd filtration unit U2 laid on the letter case 17 of closeout It consists of the dense tabular filter media 20 which consist of synthetic-resin material of the porosity around which the maintenance frame 19 and this maintenance frame 19 are looped to tubed etc. As the maintenance frame 19 is shown in drawing 1 and drawing 3 , it regards as the stellate crown plate 22 from a flat surface, an exhaust port 21 is drilled in a center section, and it sees from a flat surface, the polygonal bottom plate 23 is connected with two or more connection levers 24 at one, and it is constituted, and while a bottom plate 23 has the air through-hole 15 of a lid 14, and the opening 25 open for free passage in the center section, many through-holes 26 are drilled in the perimeter of the opening 25 by the radial. While two or more stop projections 27 caudad prolonged at equal intervals around an exhaust port 21 in the underside of a crown plate 22 protrude on one, said stop projection 27 is countered also on the top face of a bottom plate 23, and the stop projection 28 protrudes on one.

[0010] After the tabular filter media 20 stop by turns to said stop projections 27 and 28 to which the inner skin was **(ed) for said connection lever 24, and they opposite-**(ed) the peripheral face to the crown plate 22 and the bottom plate 23, and fixed maintenance is carried out at the maintenance frame 19, namely, the tabular filter media 20 were crooked in the shape of a wave, as shown in drawing 2 , and tubed has ****(ed), it is said 1st filtration unit U1. It is arranged upwards. And the clarification room 29 with the comparatively big volume which is open for free passage to said air injection-tip 7a while it is open for free passage in the letter case 17 of closeout through said negotiation hole 16 and through-hole 26 to the inside is formed, and it is the covering unit U3 to the outside. It collaborates with a medial surface and the non-purified room 30 is formed.

[0011] Covering unit U3 At least one covering 31for tubed connection b in which fitting connection is possible is arranged up and down to the open soffit of rectangular pipe-like covering 31a for wastewater and covering 31a, it is constituted, and the laminating number of stages of covering 31b for connection is suitably changed according to the filtration capacity (namely, laminating number of stages of the 2nd filtration unit U2) for Filter F to be required.

[0012] The water absorption hole 33 of a large number which the drain pipe 32 connected with said clarification room 29 in the top-face center section of said covering 31a for wastewater protrudes on one, and are open for free passage around a drain pipe 32 at said non-purified room 30 is drilled in a

radial. The engagement pieces 3 and 3 of said filter-media hold object 2 and the stop pawls 34 and 34 of the couple as the 1st stop section which can engage and release all of the engagement pieces 36 and 36 which connection covering 31b mentions later are formed in the both sides of the side-face soffit of covering 31a for wastewater at one. Moreover, between both the stop pawl 34 of a side-face soffit, and 34, the notching 35 which can serve as recess over the connector 10 connected to said charging path 9 is formed.

[0013] Said tubed covering 31b is the 2nd filtration unit U2. It has the height which can be held. On upper bed both sides of the lateral surface The stop pawls 37 and 37 of the couple as the 2nd stop section which can engage and release both the engagement pieces 3 and 3 of said filter-media hold object 2 and said engagement pieces 36 and 36 of other connection covering 31b at the soffit both sides are formed in one for the engagement pieces 36 and 36 of said couple as the 2nd locked member again. These engagement pieces 36 and the stop pawl 37 are formed in the respectively same the configuration and the magnitude as the engagement piece 3 of said filter-media hold object 2, and the stop pawl 34 of covering 31a for wastewater. In addition, the notching 38 which can serve as recess over a connector 10 is formed in covering 31b connected with the letter case 17 of closeout at least among said two or more tubed covering 31b.

[0014] When assembling the filter F of the above-mentioned configuration, it is the 1st filtration unit U1. It is the 2nd filtration unit U2 upwards. After laying, it is the 1st filtration unit U1 about tubed covering 31b. It connects. Then, said 2nd filtration unit U2 It is the following 2nd filtration unit U2 upwards. After laying, the following tubed covering 31b is connected with said tubed covering 31b, this activity is repeated successively and, finally covering 31a for wastewater is connected with tubed covering 31b of the maximum upper case. Or the 1st filtration unit U1 The 2nd filtration unit U2 of plurality [top] It is the 2nd filtration unit U2 about covering 31for wastewater a and two or more tubed covering 31b which were beforehand connected after carrying out the laminating. While covering a group, tubed covering 31b of the bottom is connected with the letter case 17 of closeout.

[0015] It ** and is the 2nd filtration unit U2. Since the area of the tabular filter media 20 can be suitably fluctuated by choosing a laminating number of stages suitably (for example, the thing of drawing 1 the thing of two steps and drawing 4 three steps), the clarification capacity of Filter F can be adjusted according to the capacity of the water which should be purified. And the 2nd filtration unit U2 Since overall configuration and magnitude of the filtration case which consists of covering 31for connection b and covering 31a for wastewater which should cover these can also be easily changed according to a laminating number of stages, the filter which has desired filtration capacity can be constituted without difficulty, and two or more kinds of filters with which filtration capacity is different from each other are simply obtained by low cost. Moreover, it can be performed easily, prospective modification of the filtration capacity of the once assembled filter also employing the component part before modification efficiently as it is.

[0016] Next, an operation of this example is explained. If the filter F constituted as mentioned above is installed in cistern 1 base which laid the pebble etc. and an air pump P is now operated as shown in drawing 1 , air will be supplied to air injection-tip 7a through an airpipe 11, a connector 10, and the charging path 9 from an air pump P, and this air will be spouted by the clarification room 29 of the tabular filter-media 20 interior in the shape of air bubbles through the air injection cylinder 8 from there. It becomes an air current, the inside of this clarification room 29 is gone up, the water in the clarification room 29 also goes up in connection with it, and that blowout air is breathed out in a cistern 1 through an exhaust port 21 and a drain pipe 32. Water absorbing power acts on the clarification room 29. Consequently, the corruption water in a cistern 1 As an arrow head shows to drawing 1 , after the part is inhaled at the non-purified room 30 from the water absorption hole 33 on the top face for wastewater of covering 31a, penetrates the tabular filter media 20 from there and is made into clarification, it flows into the clarification room 29. Moreover, it is inhaled in the letter case 17 of closeout from the water absorption hole 6 which other parts drilled in the filter-media hold object 2 of the letter case 17 of closeout through clearances, such as a pebble with which cistern 1 base was covered. After penetrating the granular filter media 18 held there and being made clarification, it flows into the clarification room

29 through the negotiation hole 16 of a lid 14, and the through-hole 26 of a bottom plate 23. And the water in the clarification room 29 defecated by passing both the filter media 18 and 20 flows into a drain pipe 32 through the exhaust port 21 by which opening was carried out to the crown plate 22 with the air injected by this clarification room 29 from the air injection cylinder 8, and is returned in a cistern 1 as clean water from there.

[0017] According to the configuration of the above-mentioned example, the tabular filter media 20 are compared with the granular filter media 18. Since water flow resistance is strong, The rate of flow of the corruption water which penetrates it becomes comparatively small, and propagation of the aerobic bacteria containing useful bacteria, such as chlorella which will be hard to generate if the rate of flow is large, is urged in the tabular filter media 20. While being able to disassemble the organic substance which adheres to the tabular filter media 20 by these aerobic bacteria, such as a feed residue and stools, and being able to prevent that blinding, bacteria, such as chlorella, can be offered as a live bait of the appreciation fish in a cistern 1.

[0018] Moreover, although the tabular filter media 20 tend to start blinding compared with the granular filter media 18, since the water in a cistern 1 is always flowing into the clarification room 29 through the granular filter media 18 with comparatively small water flow resistance within the letter case 17 of closeout from the water absorption hole 6 In the clarification room 29, water absorbing power has always occurred, therefore the water in the non-purified room 30 is inhaled through the tabular filter media 20 at the clarification room 29, the stream from the non-purified room 30 to the clarification room 29 cannot stop, it can continue at a long period of time, and the good filtration by the tabular filter media 20 can be maintained.

[0019] By the way, according to the activity of said filter F, it is the 1st filtration unit U1. The inner granular filter media 18 and the inner 2nd filtration unit U2 Although cleaning or exchange **** is periodically required for these filter media 18 and 20 since muck, such as a feed residue and stools, adheres and accumulates on the tabular filter media 20 gradually, in such a case, it is said each unit U1 and U2. And U3 It can decompose. That is, as shown in drawing 4 only by grasping Filter F and removing engagement on the engagement piece 3 of the letter case 17 of closeout, and the stop pawl 37 of covering 31b for connection of the bottom, they are the 1st filtration unit U1 and the 2nd filtration unit U2. And covering unit U3 It can decompose easily. it seems that in this case, the granular filter media 18 do not have a thing which is enclosed in the letter case 17 of closeout and which comes out, fall from this case 17 or scatters during decomposition, and the tabular filter media 20 move at ****, or they do not transform them during decomposition since maintenance immobilization is carried out at the maintenance frame 19 Therefore, disassembly of Filter F and an assembly can be performed easily.

[0020] And the 1st filtration unit U1 If it shakes and moves, pouring water for grasping, the muck which carried out adhesion deposition will be easily removed by the granular filter media 18, and if the tabular filter media 20 are removed from the maintenance frame 19 and this is washed, the muck which carried out adhesion deposition will be removed by the tabular filter media 20.

[0021] In addition, since the letter case 17 of closeout can be opened and closed with a lid 14, it can pick out the granular filter media 18 from a case 17 if needed.

[0022] As mentioned above, although the example of the filter by this invention was explained in full detail, this invention can perform various small design changes, without deviating from this invention which is not limited to said example and indicated by the claim.

[0023] In each above-mentioned example, for example, **** of covering 31for wastewater a or tubed covering 31b, and the letter case 17 of closeout, To **** of covering 31a for wastewater, and tubed covering 31b, or **** of tubed covering 31b Without being limited to this, although the example using the engagement pieces 3 and 36 and the stop pawls 34 and 37 was shown, the step which can fit in mutually may be formed in each part material, and, thereby, you may connect with it free [attachment and detachment], for example.

[0024]

[Effect of the Invention] While forming a covering unit as mentioned above by arranging one covering for wastewater, and covering for connection of the need number up and down, and stopping mutual

according to this invention Since the laminating of the filtration unit of the need number can be carried out on a bottom wall unit, said covering unit can close this filtration unit, a bottom wall unit can close the open soffit of a bonnet and this covering unit and a filter can be constituted Only by combining suitably the filtration unit, the object for wastewater, and covering for connection of a single class the number of pieces respectively Two or more kinds of filters with which the filter which has desired filtration capacity can be assembled without difficulty therefore with which filtration capacity is different from each other are simply obtained by low cost. Moreover, what will change the filtration capacity of the once assembled filter in the future can be performed easily, employing the component part before modification efficiently as it is.

[Brief Description of the Drawings]

[Drawing 1] The sectional view which meets one to 1 line of drawing 2 which shows the installation condition into the cistern of the filter which carried out this invention

[Drawing 2] The sectional view which meets two to 2 line of drawing 1

[Drawing 3] The decomposition perspective view of a filtration unit

[Drawing 4] The whole filter decomposition perspective view at the time of making a filtration unit into three layers

[Description of Notations]

1 Cistern
3 Engagement Piece as 1st Engaged Portion
7a Air injection tip
19 Maintenance Frame
20 Filter Media
29 Clarification Room
30 Non-Purified Room
31a Covering for wastewater
31b Covering for connection
32 Drain Pipe
33 Water Absorption Hole
34 Stop Pawl as the 1st Stop Section
36 Engagement Piece as 2nd Engaged Portion
37 Stop Pawl as the 2nd Stop Section
F Filter
P Air pump
U1 The 1st filtration unit as a bottom wall unit
U2 The 2nd filtration unit as a filtration unit
U3 Covering unit

[Procedure amendment 2]

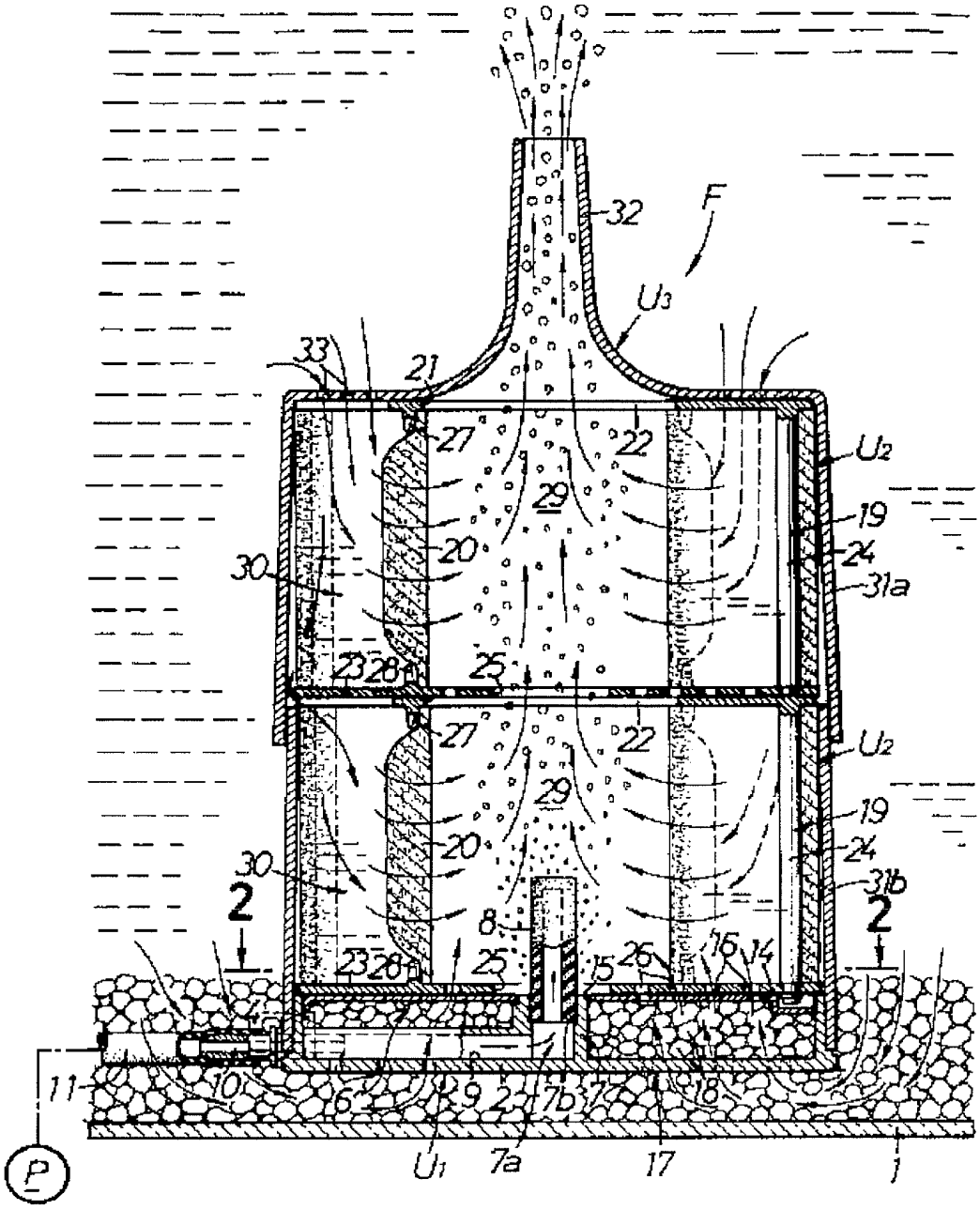
[Document to be Amended] DRAWINGS

[Item(s) to be Amended] drawing 1

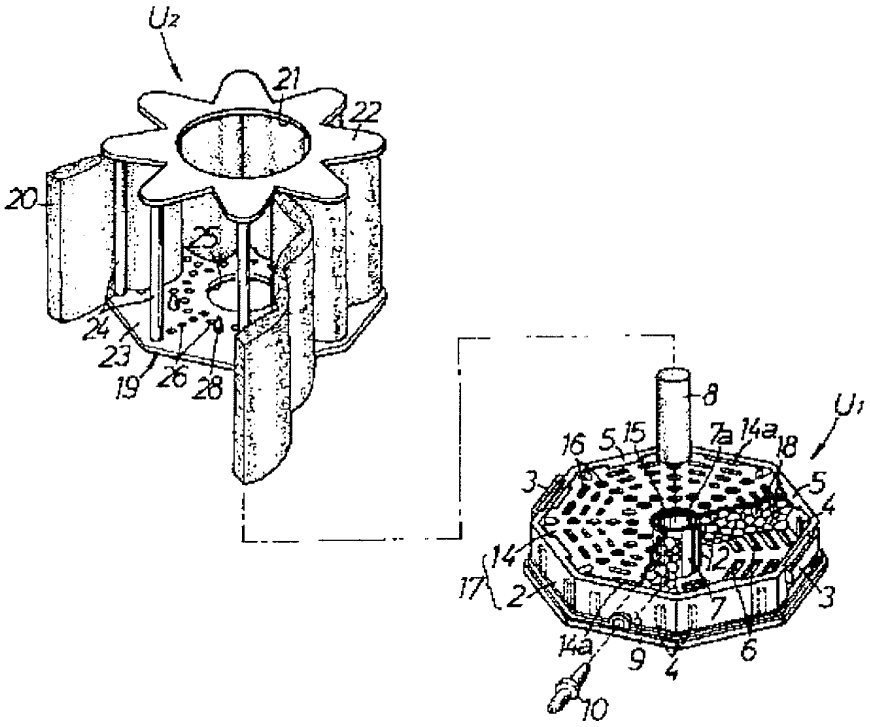
[Method of Amendment] Modification

[Proposed Amendment]

[Drawing 1]



[Procedure amendment 3]
[Document to be Amended] DRAWINGS
[Item(s) to be Amended] drawing 3
[Method of Amendment] Modification
[Proposed Amendment]
[Drawing 3]



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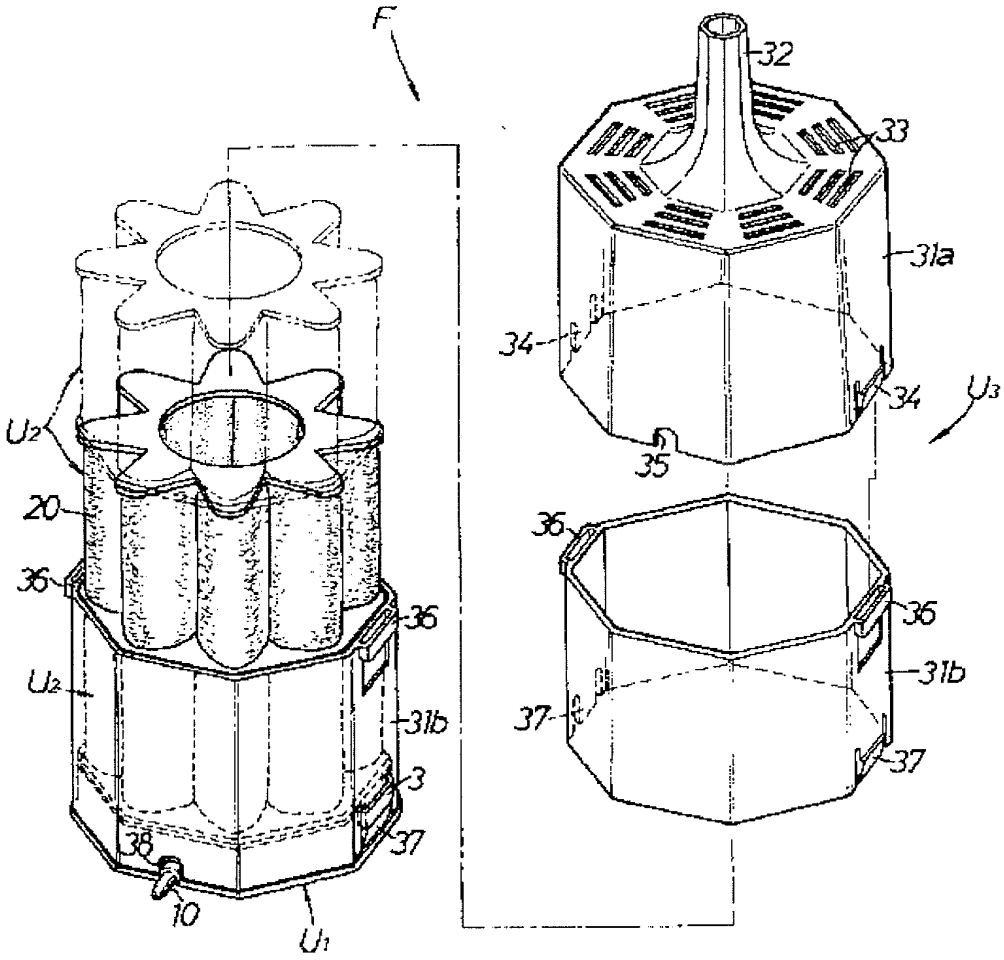
[Method of Amendment] Modification
[Proposed Amendment]
[Drawing 4]



[Translation done.]